

ARTICLE APPEARED
ON PAGE 81

AVIONICS

AVIATION WEEK & SPACE TECHNOLOGY
6 January 1986

Flexible Intelligence Work Station Designed to Meet User Requirements

By Kenneth J. Stein

Griffiss AFB, N. Y.—New-generation modular intelligence work station that can be tailored to specific users' needs is being developed in the Intelligence and Reconnaissance Div. of Rome Air Development Center (RADC) here.

Using a building-block concept based on commercial off-the-shelf hardware and software, the new intelligence work station is designed to accommodate as many as 15 hardware/software options and may be used on a stand-alone basis or with a host computer or local area network.

The Intelligence and Reconnaissance Div. is one of seven divisions maintained by RADC, which serves as the technological arm of USAF's Electronic Systems Div., Hanscom AFB, Mass. Five of the RADC divisions are located here, and two are at Hanscom.

The RADC divisions are responsible for discovering and pursuing methods of processing electronic intelligence and reconnaissance information, along with developing improved communications, surveillance, information processing and basic electronic technology.

'Skunk Works'

"We're sort of a 'skunk works' for the intelligence community, dealing with signal intelligence, imagery, processing—the total intelligence processing capability," Col. William S. Pantle, chief of the Intelligence and Reconnaissance Div., said.

Major efforts within the division reflect a broad perspective, encompassing, in addition to the intelligence work station effort, an advanced speech processing laboratory dealing with speech enhancement and voice interactive systems, advanced sensor exploitation (AW&ST Dec. 9, 1985, p. 105) and development of an on-line mass storage device employing digital disks, known as the "jukebox."

The new intelligence work station reflects the trend toward interoperability and commonality with other commands, Pantle said. Within the Air Force, it is expected to replace the present OJ-389 console for standard intelligence display applications.

Central element in the intelligence work station architecture is a National Semiconductor 32016 32-bit microprocessor, capable of addressing 16 megabytes of virtual memory, according to Barbara J. Boland,

computer sciences specialist in the division's Data Handling Branch.

By contrast, the present OJ-389 display has an 8-bit microprocessor capable of addressing a maximum of 64K of memory.

The station will have two operating systems, with all of the applications software running under the Unix System V operating system on the 32016 microprocessor. All of the input and output drives will run under the MS-DOS operating system on an 8088 microprocessor.

The work station is designed with an open system architecture with an industry standard bus. Its predecessor required rewiring of the backplane whenever the system was upgraded or expanded.

Choice of two 19-in. monochrome displays, two 19-in. color displays or a combination of these is available as an option, permitting user selection of display type and number. Graphics software is another of the available options.

High-resolution monitors support an ability to combine graphics and text.

The basic work station will have a 96-character ASCII keyboard with a standard typewriter layout, standard control keys, cursor controls, a numeric keypad and 44 programmable function keys, Boland said.

A contract awarded to Eaton Corp.'s Information Management Systems Div. calls for construction of three prototype intelligence work stations, to be followed by 136 production models differing for USAF and Navy sites. The award called for the beginning of testing on three preproduction models six months after receipt of contract, May 29, she said.

Production deliveries are scheduled to begin two months after acceptance of the three preproduction models.

The jukebox mass data storage unit, developed to support Defense Mapping Agency modernization efforts, provides storage of 10¹¹ bits per disk—equivalent to 100,000 sq. mi. of digital terrain data on each disk, according to Pantle. The system holds 125 disks and provides automated access to any data in the store in 6-10 sec.

Two units were built by RCA Corp.'s Advanced Technology Laboratories, Moorestown, N. J., under a development contract from RADC. One jukebox is at RADC, and the other is being used by National Aeronautics and Space Adminis-

tration's Marshall Space Flight Center, Pantle said.

Laser Beam

Digital contents of the disks are "read" by laser beam, in a manner resembling that employed on compact disks for consumer audio applications. An argon laser is used for record play; a helium-neon laser for tracking and focus.

The division's speech laboratory is addressing intelligence needs such as communications monitoring by systems capable of recognizing the language, the speakers and the gist of the communication, using techniques such as pattern matching, Steven Smith, a communications scientist in the laboratory, said.

Other work is directed toward machine word recognition for computer voice data entry applications and for secure voice communications.

A speech enhancement unit, operating in real time, has been developed to remove automatically undesired noise sources, such as man-made and radio-frequency interference, tones, hums and buzzes. By improving the listenability of speech signals, as Smith demonstrated, the device significantly reduces operator fatigue. This speech enhancement capability is expected to be particularly advantageous in conjunction with narrow-band jam-resistant communications links, where noise is likely to be encountered.

A flightworthy model of an audio message enhancer is being developed. By the 1990s, application of very high speed integrated circuits (VHSIC) technology is expected to provide multiple channel capability.

A closely related area deals with voice recognition for aircraft cockpit and command/control applications.

Present demonstrations, using a Votan voice recognition system, are speaker dependent and identify only isolated words and phrases.

However, the system, operated by Lt. Kenneth Ford, demonstrated a capability to place machine-made telephone calls and—upon encountering a busy signal—to tell the caller: "The colonel's number is busy. I'll call you when he's available." □

CONTINUED

RADC Development Plan

Griffiss AFB, N. Y.—Communications Div. at Rome Air Development Center here, concerned with moving and manipulating information for use by intelligence experts and battle managers, is involved in three primary development areas:

- **Signal processing**, dealing with architectures and basic techniques, as well as adaptive antennas, electronic counter-countermeasures and antijam capabilities and injection of very high speed integrated circuit technology.

- **Link mechanisms**, such as satellite relay, optical communications, line-of-sight and tropospheric links to provide advanced survivable communications.

- **Systems**, encompassing switching and routing technologies and systems control, design and analysis.

Increased emphasis is being placed on hardened communications, acoustic charge transfer technology and space-borne signal processing, Harold J. Crowley, division system engineer, said.

At the same time, work continues on EHF communications in general, integrated switching and systems control, and enduring communications that will be available when needed, Crowley said.